CUBIT Capability Proposal

Technical Area Geometry, Meshing, Infrastructure, GUI, Graphics, etc..	**Technical Lead** Cubit Developer in charge of technical area
External Support	

MRD Description
Describe the capability in terms of how a user would see it.

Ability to import many commonly used Nastran element types and metadata.

SRS Description
What needs to be done by Cubit developers to implement this capability? Break the tasks into steps if applicable. (Steps should be on the order of 2 man-weeks or more)

1. Create support for import of Nastran input deck element types. 2. Ability to create geometry based on element type, property, and feature angle 3. Ability to support additional metadata attributes for element definition. 4. Create support for export of Nastran input deck with associated metadata.

Justification
Describe why this is important and what impact it will have if it is implemented. (or not implemented).

Increase capabilities of Cubit to leverage Pro/Mechanica's ability to create midplane meshes as well as other Nastran element types.

Resources Who will work on this	**Time estimate** How much time will it take in man-weeks	**Targeted Release** 10.2 (August 06), 10.3 (March 2007), 10.4 (August 2007), Future (beyond FY07)

Submitted By:	**Date:**
Eric M. Pulling	4/26/06

Cubit Support of Nastran .bdf Deck

Element Type	Nastran Callout	Topology	Geometry	Exodus Element Type	Retained Metadata in Cubit	Cubit Needs
3d						
Hexahedral	CHEXA	8 and 20 Noded	Solid Volume	HEX8, HES20	Property name	
Tetrahedral	CTETRA	4 and 10 Noded	Solid Volume	TET4, TET10	Property name	
2d						
Quads	CQUAD4, CQUAD8	4 and 8 Noded	Surface	QUADT, QUAD8T	Property name, thickness, offset	Create one surface based on property name, feature angle, and intersection with other 2d elements
Tris	CTRIA3, CTRIA6	3 and 6 Noded	Surface	TRIA3, TRIA6	Property name, thickness, offset	Create one surface based on property name, feature angle, and intersection with other 2d elements
1d						
Bar	CBAR, RBAR	2 Noded	Curve		Property name, cross section (Moments of Inertia, Radius of Gyration), offset, area, orientation	Create one curve based on property name, feature angle, and intersection with other 1d elements

Beam	CBEAM	2 Noded	Curve		Property name, cross section (Moments of Inertia, Radius of Gyration), offset, area, orientation	Create one curve based on property name, feature angle, and intersection with other 1d elements
0d						
Mass Element	CONM1, CONM2	1 Noded	Point	CONMASS	Property name, cross section (Moments of Inertia, Radius of Gyration)	Ability to create mass element and geometry point at that location
MPC						
Rigid Body Element	RBE2, RBE3	Element specific	N/A		Type of RBE (Independent and Dependent nodes), DOFs	Ability to recognize Nastran notation and convert to appropriate Exodus element type
Spring						
Spring	CELAS2, CBUSH	2 Noded	N/A	SPRING	Spring constant and direction	Ability to recognize Nastran notation and convert to appropriate Exodus element type